

**METHOD AND DEVICE FOR SCROLLING SPEED CONTROL****TECHNICAL FIELD OF THE INVENTION**

5 The present invention relates to the field of scrolling in sets of items, for instance lists provided in portable electronic devices, and more particularly to a method and a device for varying the scrolling speed for a set of items.

**DESCRIPTION OF RELATED ART**

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The cellular phones of today have more and more different functions and applications in them. In order to sort between different functions and data relating to functions, the phones are normally provided with a menu system, in which a user can scroll in order to find data or functions that are grouped together. An example of such a group or set is for 15 instance a telephone book, which lists a number of contacts and their corresponding phone numbers.

In the phones of today, there does not to the best of our knowledge exist the possibility to scroll lists with different speeds, they all use the same scrolling speed. This is a 20 disadvantage, because different users might have different needs for scrolling fast, either because of personal differences or because of differences related to the items scrolled. One user might for instance need a faster scrolling speed than another user. The one and same user might also have a need for different scrolling speeds because for instance the number of items scrolled can be many, which might give rise to the need of a high scrolling speed, 25 whereas in some other instances a slower scrolling speed might be needed because the items scrolled are few. Another reason for varying scrolling speed is that a user might be alert with quick reactions at one point in time and tired with slow reactions at another point in time, which gives rise to the need to provide different scrolling speeds also for a single user. In short there is a need to provide personalised scrolling speeds.

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In the art of computers it is known to provide varied scrolling speeds automatically. Here the scrolling speed is increased automatically when a user is for instance scrolling a long text document. The user does however not have full control of this scrolling, and will in many cases feel that the scrolling goes too slowly in the beginning and too fast in the end 35 to be able to control the scrolling properly.

There is thus a need for providing varied scrolling speeds that can be fully controlled by a user in a simple manner.

**SUMMARY OF THE INVENTION**

The present invention is thus directed towards providing varied scrolling speeds that can be fully controlled by a user in a simple manner.

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This is achieved by detecting a scrolling action selection and a scrolling speed variation selection and changing the scrolling speed in dependence of these selections.

One object of the present invention is to provide a method enabling varied scrolling speeds  
10 that can be fully controlled by a user in a simple manner.

According to a first aspect of the present invention, this object is achieved by a method of varying the scrolling speed provided for a set of items comprising the steps of:

15 providing a set of items of information that can be scrolled by a user,  
detecting a scrolling action selection from a user,  
detecting a scrolling speed variation selection from said user, and  
changing the scrolling speed in dependence of the selections made by the user.

A second aspect of the present invention is directed to a method including the features of  
20 the first aspect, wherein the step of changing is made based on simultaneous detection of scrolling action and scrolling speed variation.

A third aspect of the present invention is directed towards a method including the features of the first aspect, wherein the scrolling speed is varied with a certain step size and the  
25 scrolling speed is varied with said step size each time a scrolling speed variation selection is detected during detection of a scrolling action selection.

A fourth aspect of the present invention is directed towards a method including the features of the first aspect, wherein the scrolling speed is varied linearly when a scrolling  
30 speed variation selection is detected during detection of a scrolling action selection.

A fifth aspect of the present invention is directed towards a method including the features of the first aspect, wherein the scrolling speed variation is either an increase or a decrease of the scrolling speed.

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A sixth aspect of the present invention is directed towards a method including the features of the fifth aspect, wherein a first user input unit allows actuation for a first direction and for a second opposite direction, each allowing scrolling in said direction, and a second user input unit allows actuation for the first and the second opposite directions, wherein the

detection of a scrolling action selection by an actuation of the first input unit for one direction together with the detection of a scrolling speed variation selection by an actuation of the second user input unit for the same direction provides a scrolling speed increase and the detection of a scrolling action selection by an actuation of the first input unit for one 5 direction together with the detection of a scrolling speed variation selection by an actuation of the second user input unit for the opposite direction provides a scrolling speed decrease.

A seventh aspect of the present invention is directed towards a method including the features of the first aspect, further comprising the step of saving a scrolling speed setting 10 based on the changed scrolling speed.

An eighth aspect of the present invention is directed towards a method including the features of the seventh aspect, wherein the step of saving is performed automatically.

15 A ninth aspect of the present invention is directed towards a method including the features of the seventh aspect, wherein the step of saving is performed after detecting a selection of saving scrolling speed from the user.

20 A tenth aspect of the present invention is directed towards a method including the features of the seventh aspect, wherein the step of saving is performed for said set of items.

An eleventh aspect of the present invention is directed towards a method including the features of the tenth aspect, wherein the step of saving is also performed for at least one other set of items.

25 Another object of the present invention is to provide a device, which provides varied scrolling speeds that can be fully controlled by a user in a simple manner and which gives the user a feeling of full control of the scrolling.

30 According to a twelfth aspect of the present invention, this object is achieved by a device for varying the scrolling speed provided for a set of items comprising:

an information presentation unit providing a set of items of information that can be scrolled by a user,

a first user input unit, for allowing a scrolling action selection by the user,

35 a second user input unit for allowing a scrolling speed variation selection by the user, and

a control unit arranged to:

provide said set of items of information on the information presentation unit,

detect a scrolling action selection by a user via said first user input unit,  
detect a scrolling speed variation selection via said second user input unit,  
and  
change the scrolling speed in dependence of the selections made by the  
5 user.

A thirteenth aspect of the present invention is directed towards a device including the features of the twelfth aspect, wherein the control unit is arranged to change the scrolling speed based on simultaneous detection of scrolling action and scrolling speed variation.

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A fourteenth aspect of the present Invention is directed towards a device including the features of the twelfth aspect, wherein the control unit is further arranged to vary the scrolling speed with a certain step size and the scrolling speed is varied with said step size each time a scrolling speed variation selection is detected during detection of a scrolling  
15 action selection.

A fifteenth aspect of the present invention is directed towards a device including the features of the twelfth, wherein the control unit is further arranged to vary the scrolling speed linearly when a scrolling speed variation selection is detected during a detection of a  
20 scrolling action selection.

A sixteenth aspect of the present invention is directed towards a device including the features of the twelfth aspect, wherein the scrolling speed variation is either an increase or a decrease of the scrolling speed.

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A seventeenth aspect of the present invention is directed towards a device including the features of the sixteenth aspect, wherein the first user input unit allows actuation for a first direction and for a second opposite direction, each allowing scrolling in said direction, and the second user input unit allows actuation for the first and the second opposite direction,  
30 wherein the control unit in detecting a scrolling action selection by actuation of the first input unit for one direction together with detecting of a scrolling speed variation selection by an actuation of the second user input unit for the same direction provides a scrolling speed increase and in detecting of a scrolling action selection by detection of an actuation of the first input unit for one direction together with detecting of a scrolling speed variation  
35 selection by an actuation of the second user input unit for the opposite direction provides a scrolling speed decrease.

An eighteenth aspect of the present invention is directed towards a device including the features of the twelfth aspect, further comprising a scroll speed storage and wherein the

control unit is further arranged to save a scrolling speed setting in the scroll speed storage based on the changed scrolling speed.

A nineteenth aspect of the present invention is directed towards a device including the  
5 features of the eighteenth aspect, wherein the control unit is arranged to automatically save the scrolling speed setting.

A twentieth aspect of the present invention is directed towards a device including the  
features of the eighteenth aspect, wherein the control unit is arranged to save the scrolling  
10 speed setting after detecting a selection of saving scrolling speed from the user.

A twenty-first aspect of the present invention is directed towards a device including the  
features of the eighteenth aspect, wherein the control unit is arranged to save the scrolling speed setting for said set of items.

15 A twenty-second aspect of the present invention is directed towards a device including the features of the eighteenth aspect, wherein the control unit is arranged to save the scrolling speed setting for at least one other set of items.

20 A twenty-third aspect of the present invention is directed towards a device including the features of the twelfth aspect, wherein the first user input unit is provided as at least one navigation key for navigating in a menu system of the device and the second user input unit is provided as at least one button on the side of the device normally used for volume settings or vice versa.

25 A twenty-fourth aspect of the present invention is directed towards a device including the features of the twelfth aspect, wherein the first user input unit is provided as at least one button on the side of the device normally used for volume settings and the second user input unit is provided as at least one navigation key for navigating in a menu system of the  
30 device.

A twenty-fifth aspect of the present invention is directed towards a device including the features of the twelfth aspect, wherein the device is a portable electronic device.

35 A twenty-sixth aspect of the present invention is directed towards a device including the features of the twenty-fifth aspect, wherein the device is a portable communication device.

A twenty-seventh aspect of the present invention is directed towards a device including the features of the twenty-sixth aspect, wherein the device is a cellular phone.

The invention has the following advantages. A user can directly and in a simple manner control the scrolling speed when he is in the process of scrolling. The Invention is also very inexpensive to implement, because it can be implemented using the user input units

5 already provided in the device and the speed variation function can be provided with just some extra software in addition to the scrolling software already existing.

The embodiment according to aspects six and seventeen has the further advantage that the increasing of the scrolling speed when the actuations corresponding to the same

10 directions coincide, and otherwise decreasing the scrolling speed also gives a user a natural and intuitive feeling that selection of change of scrolling speed matches with the scrolling direction.

The embodiment according to aspects ten and twenty-one has the further advantage that  
15 by storing the scrolling speed for a particular set of items, different scrolling speeds tailored after the different sets can be provided for a user.

It should be emphasized that the term "comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or  
20 components, but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 The present invention will now be described in more detail in relation to the enclosed drawings, in which:

fig. 1 shows a front view of a portable electronic device in the form of a cellular phone,  
fig. 2 shows a block schematic of the relevant parts of the invention inside the phone in  
30 fig. 1, and  
fig. 3 shows a flow chart of a method according to the invention.

#### DETAILED DESCRIPTION OF EMBODIMENTS

35 A device according to the invention, which here is a portable electronic device 10 is shown in a front view in fig. 1. In the preferred embodiment the device is a cellular phone 10 having an information presentation unit in the form of a display 14, a first user input unit 20 in the form of a navigation key in a keypad 18. The device also has an antenna. This is however not shown because it is provided in the interior of the phone. The device also

includes a second user input unit 16 in the form of a key or button 16 provided on the side of the phone. The button 16 is a so called volume button, which can be used for adjusting the volume setting of the phone, but in the present invention it has one further function, which will be described in more detail below. The volume button 16 can be actuated in an upwards direction and in an opposite downwards direction, which is indicated by an arrow pointing in both these directions in the figure. Apart from making and receiving telephone calls, the keypad 18 is used for entering information such as selection of functions and applications and responding to prompts and the display 14 is used for displaying functions and prompts to a user of the phone. In order to do this, the keypad 18 includes the navigation key 20, which can be used for navigating up and down through a menu system provided in the phone. This is also indicated by the navigation key 20 being provided with an arrow pointing both upwards and downwards. In the menu system sets of items are provided in the form of lists. In fig. 1 one such list of items is shown. The list is here a list of contacts provided in a phone book of the phone, where the display 14 shows the name 15 of the contact together with a phone number of the contact. In fig. 1 the list is shown as having a first item 20, showing the name of Eral and his phone number 1234, a second item 22, showing the name of Sven and his phone number 7893, a third item 24, showing the name of Tage and his phone number 3231. Part of a fourth item 26, which cannot be fully seen, is also shown for illustrative purposes. This list can be very long and in order for 20 a user to find a contact, which he might want to call, he might have to scroll a long time through this list. A list can typically include as much as 200 contacts. The antenna 12 is further used for communication with other users via a network.

Fig. 2 shows a block schematic of the different parts of the phone 10 relevant to the 25 present invention. The display 14, the first user input unit 20 and the second user input unit 20 are here shown as separate boxes connected to a control unit 28. The control unit 28 is furthermore connected to a scroll speed storage 30.

The control unit is normally provided in the form of one or more processors with 30 corresponding program memories containing suitable software code. The storage is also preferably provided in the form of a memory.

Fig. 3 shows a flow chart of the method according to the invention.

35 A preferred embodiment of the present invention will now be explained with reference to fig. 1, 2 and 3. This embodiment is also believed to be the best mode of the invention at the moment. Upon the selection of a list of items in the menu system of the phone, the control unit 28 retrieves the list of items 20, 22, 24, 26 and presents it on the display 14, step 32. The control unit 28 thereafter awaits a scrolling action selection through inputs

from the user via the navigation key 20. If the key is not actuated or depressed, step 34, the control unit continues to wait. If however the navigation key is actuated, step 34, the control unit 28 goes on and scrolls the list with a stored step size, step 36. This scrolling is performed as long as the navigation key is actuated or depressed. The step size used is  
5 retrieved from scroll speed storage 30 prior to the scrolling. As long as the navigation key is depressed the control unit 28 continues to scroll the list of items. At the same time it also awaits a scrolling speed variation selection through actuation of the volume button 16 by the user. If the volume button is not actuated, step 38, the control unit goes back and monitors the navigation key, step 34. If however the second key is actuated, step 38, the  
10 control unit 28 changes the scrolling speed.

The navigation key 20 enables the possibility to navigate in an upward direction and in a downward direction as is indicated by the arrow pointing in two directions in fig. 1. This means that if a lower part of the key is depressed, scrolling is made downwards, while if  
15 an upper part is depressed scrolling is performed in a direction upwards. The volume button also has the possibility to provide two different inputs in the same way, where the actuation in a direction upwards provides a higher volume and the actuation in a direction downwards provides a decrease of the volume. This button will according to the invention be used in a different way. When the control unit 28 thus has determined that both keys  
20 are actuated simultaneously, steps 34 and 38, it goes on and checks the direction of the scrolling selection of the first and second user input units, step 40. If both have been selected to go in the same direction, step 40, i.e. either upwards or downwards, the scrolling speed is increased with one step, step 42. However, if they have been selected to go in different directions, step 40, i.e. one in the upwards direction and the other in the  
25 downwards direction, the scrolling speed is decreased one step, step 44. This means that an actuation of the volume button in the upwards direction will only lead to an increase of the scrolling speed if the list is scrolled in the same direction. This gives a user a natural and intuitive feeling for what a scrolling speed increase or decrease would correspond to. The alternative, that one direction would always provide an increased speed would in many  
30 cases make a user feel uncomfortable when scrolling is actually performed in the opposite direction. When the scrolling speed has been increased or decreased, steps 42, 44, the new scrolling speed is automatically stored in the scroll speed storage 30 by the control unit 28, step 46, which scrolling speed is thereafter used for scrolling in this list. Thereafter the control unit 28 goes back and monitors the navigation key, step 34. This method is  
35 then continued as long as the user is present in the menu having this list and as long as he has not selected an item in the list.

The present invention has many advantages. It allows a user to get full control of the scrolling, which he would not otherwise have. One alternative less satisfactory way to

provide different types of scrolling is for example to provide a scrolling setting possibility in a special settings menu. It is often not good to provide this type of solution though, because the user might feel that it is complicated to navigate to this special menu in order to set a scrolling speed. The settings would then also have to be made for every possible

5 list of items provided, which is burdensome for a user if there are many such lists. It is preferred that the scrolling speed can be influenced directly when it is needed, i.e. when scrolling is performed. Another possible solution that has been discussed is the provision of automatic increase of the speed when the list is long. In this case the user feels he has no real control of the scrolling process. According to the present invention a user can directly

10 and in a simple manner control the scrolling speed when he is in the process of scrolling. For a suitable selection of step size in the device, the scrolling speed can be incremented and decremented such that it suits the particular user at the particular time. By storing the scrolling speed for the particular list, different scrolling speeds tailored after the different lists can be provided for a user. The provision of increasing of the scrolling speed when the

15 actuations corresponding to the same directions coincide, and otherwise decreasing the scrolling speed also gives a user a natural and intuitive feeling that selection of change of scrolling speed matches the scrolling direction. The invention is also very inexpensive to implement. By providing the scroll speed control with the volume button, there is furthermore no need for any additional buttons or keys on the phone and the speed

20 variation function can be provided with just some extra software in addition to the scrolling software already existing.

The present invention can be varied in many ways. The scrolling speed was described as being varied stepwise. It should be realised that it can just as well be changed linearly.

25 The saving of the scrolling speed might as an alternative be made after approval of the user, which approval could be made through depressing any of the keys in the keypad. The saved scrolling speed might furthermore be made to apply to more than one list, like for instance all lists. The keys described were keys, where one key can be used for indicating two directions. It is of course also possible to provide this functionality with two separate

30 keys. The same is true for the volume button. This can also be provided as two separate buttons that either increase or decrease the volume. The navigation key was furthermore described in relation to providing navigation in only upwards and downwards directions. Naturally it is also possible to provide navigation sideways. It should also be understood that the scrolling control according to the invention could also be performed for navigation

35 sideways. The use of the buttons described can furthermore be the opposite, in that the volume button can be used for scrolling and the navigation button be used for scrolling speed control. The invention is of course not limited to these types of buttons or keys at all, but can be used with any keys provided on a device. The set of items was described in relation to a list of contacts and their phone numbers. The invention is not limited to this,

but can be provided for any set of items, such as a list of received or sent messages, a list of functions or a list of settings that can be made. It is also applicable to scrolling in for instance a text file. The invention was described in relation to a cellular phone. A cellular phone is just one example of a device in which the invention can be implemented. The 5 invention can for instance also be used in a PDA (personal digital assistant), a palm top computer a lap top computer and a regular PC. Therefore the present invention is only to be limited by the following claims.